

SCRIBING METHOD FOR SAPPHIRE SUBSTRATE

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Abstract

PURPOSE: To prevent a fine crack at the periphery of a groove of a sapphire substrate by emitting a laser beam to the surface of the substrate having a thickness of 350-500μm to form a groove having approx. 90-120μm of depth, bending the substrate along the grooves and dividing it.

CONSTITUTION: A spot of a CW exciting Q switch YAG laser is emitted to a sapphire substrate, is scanned as a pulse having 10-20kHz of repetition rate for several mm./sec., thereby forming a groove. At this time, the characteristics of the number of cracks-depth of the groove can be designated by a curve (b) in the scanning of forward seam direction and by a curve (a) in the reverse seam direction. The cracks are abruptly increased in the depth deeper than 120μm in the reverse scanning, and in the depth deeper than 200μm in the forward beam scanning which is opposite to (b). When the depth of the grooves is set to 90-120μm even in the sapphire of 350-500μm thick to be used ordinarily in the lattice shape, no fine crack is produced at the periphery of the groove when the substrate is bent along the grooves, thereby improving the yield and since no dependency exists in the scribing direction, the scanning mechanism can be simplified.

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